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ROYAL BOTANIC GARDENS, KEW.

BULLETIN

OF

MISCELLANEOUS INFORMATION.

No. 5] [1914

XXXI.—NEW FAGACEAE FROM THE MALAY PENINSULA.

J. S. Gamble.

1. **Pasania Kingiana,** *Gamble* [Fagaceae]; species monticola distincta, *P. lappaceae,* Oerst., quoad faciem glandis cupulae affinis, sed foliis percoriaceis, floribus solitariis, ♀ longe stylosis insignis.

Arbor, ramulis crassis nodosis nigro-brunneis. *Folia* percoriacea, glabra, ovata, apice obtuse acuta, basi rotundata, 6–12 cm. longa, 3–6 cm. lata, supra lucida, infra prominenter reticulata, margine recurva, costa crassa; nervi utrinque 6–8, ad marginem curvati; nervuli transversi irregulares; petiolus crassus, circa 4 mm. longus. *Spicae* 10–12 cm. longae, ♂, ♀ et androgynae mixtae, e foliorum ultimorum axillis; rhachis crassa, angulosa, puberula. *Flores* solitarii, in spicis androgynis inferiores ♀, tum pauci ♂♀, deinde supremi ♂, omnes bracteolis lanceolatis 2 mm. longis et squamarum pulvinis muniti; perianthium ♂ 2 mm. longum, in lobos 6 acutos 1 mm. longos divisum, ♀ paullo minus; stamina 12 vel pauciora, filamentis gracilibus, in ♂♀ brevibus; pistillodium in ♂ conspicuum, villosum; styli in ♀ 3, cylindrici, 2·5 mm. longi. *Cupula* cyathiformis, 2–2·5 cm. longa, squamis patentibus puberulis 3 mm. longis instructa, pedicello 6 mm. longo, margine recurva, prope basin squamae ovatae, magnae, saepe 5 mm. longae, supra gradatim minores; glans ovoideo-globosa, basi complanata, velutina, 2–2·7 cm. diametro et 1·5–2 cm. alta, umbone crasso.

Malay Peninsula. Perak: on Gunong Bubu and Gunong Inas, 1300–1500 m., *Wray* 3910, 4155. Pahang: Gunong Brumber, 2100 m., *Wray* 1586.

2. **Pasania lampadaria,** *Gamble* [Fagaceae]; species distincta sectionis *Cyclobalanus,* foliis magnis percoriaceis et cupulis tribus connatis insignis.

Arbor parva, ramulis crassissimis, cortice laevi griseo vel fere nigro lenticellis rotundatis ornato. *Folia* percoriacea, lanceolata, apice acuminata, acumine obliquo obtuso, basi attenuata et plus

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minusve in petiolum attenuata, 20–25 cm. longa, 6–10 cm. lata, supra laevia, lucida, infra pallida, pubescentia minuta adpressa instructa, marginibus integris recurvis; costa crassissima, prominens; nervi utrinque 12–14, primum fere recti, deinde arcuati; reticulatio obscura; petiolus crassissimus, rugosus, 1–1·5 cm. longus. *Flores* ignoti. *Fructus* (immaturi) sessiles, in spicis crassis circa 10 cm. longis, generaliter per tres connati, aliquando plures, aliquando solitarii vel bini; cupulae glandem includentes, utriusque glandis lamellis circa 5 minute denticulatis; glandes albo-sericeae; umbo prominens, conoideus.

Malay Peninsula. Perak: in mountain regions 1000–1500 m., Gunong Batu Puteh and Ular Batang Padang, *Wray* 1176, 1514. "Used for torches in fishing by Sakais."

3. **Castanopsis malaccensis,** *Gamble* [Fagaceae]; *C. javanicae*, A.DC., affinis sed cupulae spinis tenuioribus, foliis basi rotundatis, ramulorum lenticellis vix conspicuis.

Arbor; ramuli graciles, cortice nigro-brunneo vix lenticellato; innovationes fusco-pubescentes; gemmae ovoideae, perulis ovato-acutis. *Folia* haud coriacea, ovata vel lanceolata, apice acuminata et saepe mucronata, basi saepe inaequaliter rotundata, 5–10 cm. longa, 3–4 cm. lata, supra juventute lepidoto-puberula, postea glabra, siccitate olivacea, infra minute fusco-puberula, margine integro; costa gracilis, supra impressa; nervi utrinque 8–10, ad marginem curvati; nervuli transversi multi, reticulationem areolatam includentes; petiolus gracilis, 0·8–1 cm. longus. *Flores* ignoti. *Fructus* (immaturi) globosi, 1·5–2 cm. diametro, in spicis gracilibus axillaribus ad 10 cm. longis; cupula tenuis, densissime et fere omnino spinarum rectarum acutissimarum 1–1·5 cm. longarum fasciculis tecta; spinae raro ramosae, acumine ultimo excepto pilis fuscis strigosis munitae; nuces plerumque 3, sericeae.

Malay Peninsula. Malacca: *Maingay*, K.D. 1461; Brisa, *Derry* 947.

4. **Castanopsis Scortechinii,** *Gamble* [Fagaceae]; *C. malaccensi*, Gamble, affinis, spinis magis ramosis pilis longis strigosis tectis, foliis ellipticis infra dense ferrugineo-pubescentibus.

Arbor; ramuli crassi, cortice griseo, conspicue furfuraceo-pubescentes; gemmae ovoideae, perulis lanceolatis acuminatis patentibus 5 mm. longis. *Folia* subcoriacea, elliptica vel paullo oblanceolata, apice cuspidato-acuminata, basi acuta, 8–12 cm. longa, 3–5 cm. lata, supra costa excepta glabra, siccitate olivacea, infra dense ferrugineo-pubescentia, margine integro; costa gracilis, pubescens; nervi utrinque 12–15, graciles et paullo impressi, primum fere recti, deinde ad marginem curvati; nervuli transversi multi, irregulares, recticulationem obscuram includentes; petiolus crassus, brevissimus, 5 mm. longus, pubescens. *Spicae* ♂ ignotae, ♀ circa 15 cm. longae, axillares vel ramulis ultimis laterales; rhachis grisea et furfuraceo-pubescens. *Flores* ♀ solitarii, bracteolis brevibus suffulti. *Fructus* globosi, circa 2 cm. diametro; cupula spinarum peracutarum ad 1·2 cm.

longarum fasciculis tecta; spinae cervi cornus more ramosae et pilis longis fulvis munitae.

Malay Peninsula. Perak (without number or locality), *Scortechini*.

5. **Castanopsis fulva,** *Gamble* [Fagaceae]; *C. costatae,* A.DC., affinis, nucibus 3 nec 1, spinarum fasciculis vix in annulis dispositis, ramulis haud lenticellatis et foliis infra furfuraceo-tomentosis differt.

Arbor ad 18–24 m. alta et 45–60 cm. trunci diametro, ramis patentibus; ramuli crassi, purpureo-brunnei, dense fulvo-tomentosi, vix lenticellati; gemmae ovoideae, perulis ovatis acuminatis tomentosis. *Folia* coriacea, elliptica vel elliptico-oblonga, apice breviter et abrupte acuminata, basi acuta vel paullo rotundata, 8–16 cm. longa, 3–7 cm. lata, supra lucida, glabra, infra furfuraceo-villosa, margine integro incrassato recurvo; costa crassa, supra impressa, siccitate fulvo-tomentosa; nervi utrinque 12–16, paralleli, primum fere recti, deinde curvati et prope marginem arcuati; nervuli transversi haud prominentes, irregulares; petiolus 1·2–2 cm. longus, fulvo-tomentosus. *Spicae* ♂ ignotae, ♀ ad 18 cm. longae; rhachis griseo-tomentosa. *Flores* ♀ plerumque per 3 aggregati, bracteolis multis ovato-lanceolatis imbricatis suffulti; perianthium griseo-tomentosum; styli breves, patentes. *Fructus* globosi, 2–2·5 cm. diametro, in spicis circa 20 cm. longis; cupula tenuis, plus minusve dense spinarum acutarum 4–5 mm. longarum fasciculis tecta; spinae cervi cornus more ramosae, curvatae, complanatae; fasciculi breviter caulescentes; nuces 1–4, pericarpio sericeo-villoso, umbone conspicuo.

Malay Peninsula. Perak: Batang Padang, 90–150 m., *King's Collector* 7751. Selangor: Sungei Buloh, *Mohamund Hashim* for *A. M. Burn-Murdoch* 38.

6. **Castanopsis Andersonii,** *Gamble* [Fagaceae]; *C. Schefferianae,* Hance, affinis, foliis longioribus magis nervosis, petiolo longiore, fructus aculeis bis longioribus differt.

Arbor; ramuli modice crassi, cortice griseo-brunneo, ultimi minute fulvo-pubescentes; gemmae globosae, glabrae, perulis ovatis acutis vel acuminatis. *Folia* tenuiter coriacea, obovata vel oblanceolata vel elliptico-oblonga, apice acuta, basi acute attenuata, 8–16 cm. longa, 3–6 cm. lata, supra glabra, lucida, olivacea, infra rufo-brunnea, margine integro paullo recurvato; costa gracilis, prominens; nervi utrinque 10–15, ad marginem curvati et ibi arcuati; nervuli transversi obscuri, subparalleli, reticulationem areolatam includentes; petiolus gracilis, 1·5–2·5 cm. longus. *Spicae* ♂ graciles, ad 20 cm. longae, in paniculis terminalibus vel axillaribus; ♀ ignotae. *Flores* ♂ solitarii vel fasciculati, bracteolis ovatis 1 mm. longis; perianthii lobi 6, fere liberi, ovati, villosi, 1 mm. longi; stamina 12, filamentis longis et antheris parvis globosis; pistillodium pervillosum. *Fructus* sessiles, in spicis crassis circa 15 cm. longis, globosi vel duplo-globosi et transverse elongati, obscure 4-canaliculati, 2·5 cm. alti, 3·5 cm. longi et 2 cm. lati; cupula crassa, spinarum acutarum vix

ramosarum 0·5–1 cm. longarum fasciculis tecta; spinae fulvo-puberulae, curvatae, complanatae, striatae; nuces 3, quarum 1 vel 2 abortivae, ovoideo-complanatae, praeter basim rugosam dense rufo-sericeae.

Malay Peninsula. Malacca: Sungei Hudang, *Goodenough* 1593. Singapore: *T. Anderson* 85; *Kurz; Hullett* 74; Changi, Tanglin and in Garden Forest, *Ridley* 3388, 3389, 10162, 11353.

7. **Castanopsis megacarpa,** *Gamble* [Fagaceae]; species insignis fructu magno ad 5–6 cm. diametro spinarum longarum uno latere excepto fasciculis praedito, glande unica, pericarpio cupulae percrassae adnato, foliis infra cinnamomeo-pubescentibus.

Arbor magna, ad 12–18 m. alta et 60–90 cm. trunci diametro, ramis patentibus; ramuli modice crassi, cortice brunneo, lenticellis parvulis; gemmae ovoideae, perulis lanceolatis fulvo-velutinis. *Folia* coriacea, oblonga vel elliptico-oblonga vel elliptica, apice breviter cuspidato-acuminata, basi aliquando inaequaliter acuta vel rotundata, e 8–14 cm. longa et 3–4 cm. lata ad 16–24 cm. longa et 5–9 cm. lata, supra glabra, olivacea, infra minute fulvo- vel cinnamomeo-pubescentia, margine integro recurvo; costa modice crassa, prominens; nervi utrinque 12–16, paralleli, leviter curvati ad marginem et ibi fortiter curvati; nervuli transversi multi, subparalleli, reticulationem obscuram includentes; petiolus 1·5–2·5 cm. longus, basi inflatus. *Spicae* graciles, ad 20 cm. longae, in paniculis laxis terminalibus vel axillaribus, praecipue ♂; rhachis gracilis, angularis. *Flores* ♂ in glomerulis bracteola ovata suffultis; perianthii lobi 6, fere liberi, villosi, 1 mm. longi; stamina 12, filamentis subbrevibus et antheris parvis globosis; pistillodium parvum, villosum; ♀ ignoti. *Fructus* globosi, maturi ad 5–6 cm. diametro, in spicis gracilibus; cupula percrassa (basi 1 cm., medio 5 mm.), granulosa, uno latere excepto tuberculis raris crassis stipitem formantibus cujus e vertice radiant spinae graciles pubescentes vel subglabrae 1–1·5 cm. longae cervi cornus more ramosae; glans 1, pericarpio cupulae umbone excepto adnato; semen ovoideum, 2·5 cm. longum, 2 cm. diametro, testa pubescente, cotyledonibus sinuatis.

Malay Peninsula. Perak: up to 600 m., Larut and Kinta, *King's Collector* 3488, 3939, 6386, 6469, 6522, 7070. Malacca: *Maingay* K.D. 1459/3; Ayer Panas, *Goodenough* 1316; Sungei Udang, *Derry* 1093. Singapore: Bukit Timah, etc., *Ridley* 5118, 6683, 6894, *Cantley* 25.

This species with *C. Ridleyi* and *C. Andersonii* was included in the Flora of British India and in Sir George King's Monograph under *Castanopsis javanica*, A.DC. from which it differs entirely in its fruit.

8. **Castanopsis Ridleyi,** *Gamble* [Fagaceae]; *C. megacarpae*, Gamble, affinis, sed foliis minoribus lanceolatis, fructu multo minore, cupula omnino spinarum fasciculis in annulis obliquis tecta.

Arbor magna, ad 18–24 m. alta et 60–90 cm. trunci diametro, ramis patentibus; ramuli graciles, cortice brunneo, lenticellis multis pallidis rotundatis; gemmae ovoideae, perulis lanceolatis

fulvo-pubescentibus. *Folia* coriacea, lanceolata, apice breviter acuminata et mucronata, basi plerumque inaequaliter acuta vel rotundata, 6–13 cm. longa, 3–5 cm. lata, supra glabra, lucida, olivacea, infra glaucescentia, minute puberula, margine integro recurvo; costa gracilis, supra paullo impressa, infra prominens; nervi utrinque 10–14, paralleli, ad marginem fere recti et ibi subito curvati; nervuli transversi multi, paralleli, ramosi, reticulationem areolatam includentes; petiolus gracilis, 1–1·5 cm. longus. *Flores* ignoti. *Fructus* oblongi vel globoso-oblongi, 3 cm. longi, 2–2·5 cm. diametro, in spicis gracilibus circa 10–12 cm. longis; rhachis vix 2 mm. diametro; cupula crustacea, granulosa, 3 mm. crassa, glabra vel paullo fusco-puberula, spinarum gracilium fasciculis raris stipitatis 0·8–1 cm. longis in annulis obliquis omnino tecta; spinae rectae vel curvatae, cervi cornus more ramosae, apice excepto strigose pubescentes; glans 1, ovoideo-oblonga, 2·5 cm. longa, pericarpio umbone exserto excepto cupulae adnato; semen oblongum, obtusum, testa membranacea sericea, cotyledonibus irregularibus.

Malay Peninsula. Perak: on low ground, *King's Collector* 6831. Malacca: Sungei Udang, *Goodenough* 1479.

XXXII.—DECADES KEWENSES

Plantarum Novarum in Horti Regii Conservatarum.

DECADES LXXVIII.—LXXIX.

771. **Clematis Bourdillonii,** *Dunn* [Ranunculaceae]; *C. Gourianae*, Roxb. et *C. hedysarifoliae*, DC., affinis, a priore floribus minoribus et connectivo producto, a secunda foliis planis integris et planta tota minus pubescente distincta.

Frutex alte scandens, praeter flores glaber. *Folia* ternata vel biternata; foliola lanceolata vel ovata, 6–9 cm. longa, acuta, apiculata, integra, tandem reticulata; petioli foliis bis breviores. *Flores* 2 cm. diametro in paniculas terminales axillaresque dispositi. *Sepala* 4, lanceolato-oblonga, subanthesi reflexa, extus pubescentia, intus glabra, margine tomentosa. *Staminum* filamenta linearia, glabra, antheris latiora, connectivo in appendicem 1 mm. longam producto. *Achaenia* non visa.

India. Travancore: Merchiston Estate, evergreen forests, 750 m., flowering in April and May, *Bourdillon* 554, 860.

772. **Clematis theobromina,** *Dunn* [Ranunculaceae]; a *C. smilacifolia*, Wall., foliis trifoliolatis, tomento interno sepalorum persistente antherisque muticis distincta.

Frutex alte scandens, praeter flores glaber. *Folia* ternata vel superiora simplicia; foliola ovata, 6–12 cm. longa, basi obtusa vel cordata, apice acuta vel acuminata, integra, palmatim 5–9-nervia; petioli foliis paulo breviores, basi semi-amplexicaules. *Flores* 4–6 cm. diametro, solitarii, axillares et terminales; pedunculi 7–11 cm. longi, bracteolis 2 foliaceis prope basin ornati. *Sepala* 4–6, oblongo-lanceolata, apice obtusa, utrinque velutina, extus cacaina, intus rubida, margine scariosa concolore,

anthesi patentia. *Staminum* filamenta antheris latitudine aequalia, eis 6–9-plo longiora, antheris post anthesin spiraliter tortis, connectivo haud producto. *Achaenia* ovoidea, hirsuta, caudis longis plumosis.

India. Madras Pres.: Coimbatore Dist.; Nilgiri hills, Conoor, 2000–2500 m., *Clarke* 10987, 11080; Neddivattam, *Lawson*. Flowering from March to September.

773. **Sageraea grandiflora,** *Dunn* [Anonaceae]; *S. Dalzellii*, Bedd., floribus bis majoribus, staminibus bis paucioribus distincta.

Arbor pulchra, magna vel mediocris, praeter gemmas et ovaria glabra, cortice griseo rugoso. *Folia* oblonga, 25–35 cm. longa, 7–10 cm. lata, basi rotundata, apice breviter acuminata, integra, utrinque laevia, nervis marginem approximantibus 10–12-paribus; petioli 8–9 mm. longi. *Flores* in nodis infra folia fasciculati, pedunculis 2·5–3 cm. longis. *Sepala* 3, lata, ciliata, 2–3 mm. longa, basi connata. *Petala* 6, imbricata, rotundata, ciliata, exteriora 1·5 cm. longa, interioribus bis majora. *Stamina* 12, obovata, antherae loculis distantibus. *Ovaria* 3, strigosa, stigmate brevi integro; ovula 12–14. *Fructus* nondum visus.

India. Travancore: Keni, evergreen forest, 60–70 m., *Bourdillon* 469.

774. **Uvaria eucincta,** *Bedd. ex Dunn* [Anonaceae]; ab *U. macropoda*, Hook. f. et Thoms., et calyce globoso apice obtuso anthesi irregulariter rumpente distincta.

Frutex magnus, scandens. *Folia* oblonga, 15–25 cm. longa, apice breviter acuminata, basi rotundata, supra glabra, subtus paullo pilis stellatis rufis conspersa; petioli 6–10 mm. longi. *Flores* polygami, solitarii, 4·5–5 cm. diametro, foliis oppositi; pedunculi ut calyces tuberculis rufis scabri, 1 cm. longi, crassi. *Calyx* globosus, 1·2 cm. diametro, apice rotundatus, anthesi irregulariter rumpens. *Petala* 6, ovata, apice rotundata, basi coalita, utrinque tomentella. *Stamina* ∞, in floribus masculis ob apices truncatos pulvinos semiglobosos formantia, in bisexualibus annulos circum carpella efficientia. *Ovaria* numerosa, multiovulata.

India. Madras Pres.: Ganjam District; Goomsur Hills, *Beddome* 49; Russelondak Hills, *Beddome* 50; hills above Kurcholi, *Beddome* 51.

775. **Goniothalamus rhynchantherus,** *Dunn* [Anonaceae]; a *G. Thwaitesii*, Hook. f. et Thoms., antheris rostratis distincta.

Arbor parva, praeter flores omnino glabra. *Folia* oblonga, 9–16 cm. longa, apice breviter acuminata, basi obtuse cuneata, venis inconspicuis 10–12-paribus; petioli 6–9 mm. longi. *Flores* solitarii, axillares, 1·2–1·5 cm. longi; pedunculi 0·8–1·2 cm. longi. *Sepala* 3, ovata, acuta, apice obtusa, extus subglabra, intus sparse puberula. *Petala* 6, 2-seriata, exteriora 1–1·3 cm. longa, primo valvatim cohaerentia, mox apice hiantia et tandem distincta, erecta, cetero sepalis similia; interiora dimidio minora, utrinque pubescentia, apice supra genitalia mitriformia, basi hiantia. *Stamina* ∞, sessilia, antheris cuneatis apice in rostrum conicum

1 mm. longum productis. *Ovaria* pauca, biovulata. *Carpella* immatura oblonga, glabra, subsessilia.

India. Tinnevelly District: Courtallum; in dense jungle, *Wight* 29 (Kew distribution number); Paupanassum Hills and Courtallum, *Beddome*; Kannikatii, *Barber* 3006. Travancore, *Beddome* 52.

776. **Unona Ramarowii,** *Dunn* [Anonaceae]; carpellis solidis glabrescentibus paullo torulosis ab *U. pannosa*, Dalz., quae baccas pulposas velutinas globosas habet, distincta.

Arbor parva vel frutex ramulis rugulosis, novellis pubescentibus. *Folia* (7–) 10–20 cm. longa, oblongo-acuminata, basi obtuse cuneata, pellucido-punctata, papyracea, supra opaca, glabra, subtus sparsissime adpresse hirsuta, venis 8–10-paribus supra impressis subtus prominulis; petioli 4–5 mm. longi. *Sepala* 3, ovata, acuta, villosa, 6 mm. longa. *Petala* 6, straminea, lanceolata, praeter unguem interne glabrum tomentosa, 3 exteriora anguste lanceolata, 3–5 cm. longa, 3 interiora paullo breviora sed latiora. *Torus* paullo elevatus, strigosus. *Stamina* ∞, cuneata, connectivo truncato anterius paullo producto. *Ovaria* 8–10, dense hirsuta; stigma depresso-capitulatum; ovula 2–4. *Carpella* matura 3–5, cylindrica vel torulosa, 1–2·5 cm. longa, 0·6 cm. lata, subito acuminata, basi in pedicellum brevissimum angustata, subglabra; pericarpium tenue. *Semina* 1–3, septis transversis divisa, 4 mm. diametro, testa laevi.

India. Travancore: Quilon (fruit in October), *Wight*; Pooleary Pass near Quilon, *Madras Herb.*; Aryankavu evergreen forests, *Bourdillon* 21, *Rama Row* 1845; moist forests, 600–1300 m., *Bourdillon* 44; Makará, evergreen forests (flowering September and October), *Rama Row* 1655. Madras Pres., Malabar Dist.: Wynaad, *Beddome*; S. Kanara Dist. Ghats, *Madras Herb.*

777. **Crotalaria Bourneae,** *Fyson* [Leguminosae-Genisteae]; a *C. ovalifolia*, Wall. ex Fyson, ramulis rigidis, bifurcatim ramosis, corolla inclusa recedit.

Caulis usque e radice bifurcatim ramosus, 10–15 cm. longus, plus minusve erectus, gracilis, pubescens. *Folia* elliptica vel oblonga, utrinque obtusa vel subacuta, 1·8–2 cm. longa, 5–6 mm. lata, in sicco supra nigra, pagina utraque dense pubescentia, nervis lateralibus utrinque 3–4 infra prominentibus; stipularum alae apice usque ad 8 mm. latae, subito in alam vix conspicuam paulo ultra internodii medium extensam contractae. *Pedunculi* 1·5–2 cm. longi, uniflori, circiter medium bractea floreque aborto instructi; bracteolae lineari-oblanceolatae. *Calycis* tubus 2 mm. longus, lobi 1·2 cm. longi. *Corolla* in calyce inclusa, vix 7 mm. longa. *Legumen* 2·6 cm. longum, 7 mm. diametro, stipite 2 mm. longo suffultum.

South India. Madras: Pulneys, 2100 m., *Fyson* 1093, 2053, 2116, 2164.

778. **Crotolaria conferta,** *Fyson* [Leguminosae-Genisteae]; a *C. scabrella*, W. et A., foliis minoribus, corolla calycem superante, legumine breviore distincte stipitato recedit.

Caules e radice perenni, graciles, 15–20 cm. longi. *Folia* elliptica, utrinque acuta, 1–1·3 cm. longa, 2–6 mm. lata, pagina utraque sericeo-pubescentia, supra scabridula, in sicco conspicue cuprea, nervis lateralibus haud conspicuis; stipularum alae apice 7 mm. latae, ad nodum proximum extensae eumque versus gradatim marginibus curvatis angustatae. *Pedunculi* 2 cm. longi, uniflori, bracteis paucis parvis floribusque sterilibus instructi. *Calyx* 1·2 cm. longus, sericeus. *Corolla* calycem superans. *Legumen* 2 cm. longum, 7 mm. diametro, stipite 1·5 mm. longo suffultum.

South India. Madras: Pulneys, in grass of the open downs, *Fyson* 473.

779. **Crotalaria ovalifolia,** *Wall. ex Fyson* [Leguminosae-Genisteae]; affinis *C. alatae,* Hamilt., a qua floribus majoribus, stipulis superne latioribus inferne valde angustatis, foliis brevioribus et latioribus, ramis debilioribus recedit; a *C. scabrella,* W. et A., ramis debilioribus, floribus minoribus, stipite leguminis breviore et foliis obtusis recedit.

Radix crassa, perennis; ramuli tenues, 1·5–3 cm. longi, diffusi vel magis minusve erecti, juventute pubescentes. *Folia* elliptica ad obovata vel orbicularia, obtusa vel emarginata, 1–2·5 cm. longa, pagina superiore et nervis inferiore primo molliter griseo- vel brunneo-pubescentia, demum glabrescentia, supra in sicco fusca atrave, nervis lateralibus utrinque 3–4 infra prominentibus, subsessilia; stipularum alae apice 6–7 mm. latae, usque ad nodum proximum vel ad internodii medium tantum productae gradatimque angustatae. *Pedunculi* 3–5 cm. longi, uni- vel biflori, floribus satis distantibus; bracteae 4 mm. longae; bracteolae lanceolatae, 3 mm. longae. *Calycis* tubus 2 mm. longus, lobis 1–2 cm. longis pubescentibus. *Corolla* inclusa vel vix exserta. *Legumen* 3 cm. longum, 1 cm. diametro, sessile vel subsessile.—*C. rubiginosa,* var *typica,* Baker in Hook. f. Fl. Brit. Ind. ii. p. 69, non Willd.

South India. Madras: Nilgiris, *Wight* 689, 690, 690A, *Schmidt, Gardner*; Snowdon, 2400 m., *Fyson* 659; Pulneys, *Wight* 586 (Kew Distr.); Dindigul, *Wall. Cat.* 5411; Maybaum, *Adams.*

780. **Potentilla Purdomii,** *N. E. Brown* [Rosaceae-Potentilleae]; species distinctissima, foliis pinnatis utrinque viridibus foliolis basi latissime sessilibus, carpellis apice tantum pilosis stylo filiformi ab omnibus differt.

Herba perennis, ad 30 cm. alta. *Folia* radicalia, pinnata, 8–15 cm. longa, 1·5–2·7 cm. lata, erecta, apice recurva; foliola 11–20-juga, 0·6–1·5 cm. longa, 0·7–1·7 cm lata, suborbicularia, basi latissime sessilia (haud contracta), 5–11-dentata, alterna parte superiore minora ovata integra, supra glabra, subtus pilis perpaucis conspersa, utrinque viridia; folia caulina 2–3, sessilia, pinnatisecta, 1·5–3·5 cm. longa, segmentis lanceolatis acutis integris; stipulae pinnatifidae. *Caules* floriferi ad 30 cm. alti, apice laxe 3–5-flori, minute puberuli, rubescentes. *Pedicelli* 1–3·5 cm. longi, glanduloso-puberuli. *Sepala* exteriora 3 mm. longa, lineari-lanceolata, subacuta; interiora 4·5–6 mm. longa,

anguste deltoidea, acuta, glanduloso-pubescentia. *Corolla* 1·5–1·7 cm. diametro, lutea; petala 6–6·5 mm. longa, 7–8 mm. lata, late obcordata, basi biauriculata. *Stamina* 16–25. *Discus* glaber. *Receptaculum* breviter conicum, glabrum. *Carpella* 1·5 mm. longa, apice tantum pilosa; stylus oblique terminalis, 3 mm. longus, filiformis, stigmate acuto.

North China, without precise locality, *Purdom* 563.

Described from a living plant sent to Kew by Messrs. J. Veitch & Sons, who raised it from seed collected by Mr. Purdom in North China.

There seems to be no species in Wolf's recent monograph near which this can be placed. In habit it is something like *P. leuconota*, Don, but the silvery leaves, narrow based leaflets and small flowers of the latter are utterly different from those of *P. Purdomii*, whilst the long subterminal filiform style and hairy carpels of *P. Purdomii* would, according to Wolf's arrangement, place it far away from that species. *Wilson* 3454 I think belongs here, but in that the flowering stems are only 10–15 cm. long, otherwise it agrees with Purdom's plant.

781. **Lasianthus coffeoides,** *Fyson* [Rubiaceae-Psychotrieae]; ab affini *L. capitulato*, Wight, indumento petiolorum inflorescentiaeque magis adpresso, foliis angustioribus brevioribusque, calycis lobis multo minoribus recedit.

Caulis simplex, erectus, ramis longis gracilibus tenuibus adpresse pubescentibus. *Folia* insigniter bifaria, anguste ovato-elliptica, 9–10 cm. longa, 3–3·5 cm. lata, supra glabra, nitida, infra nervis adpresse pubescentia, nervis lateralibus utrinque 6–9, petiolo 5 mm. longo adpresse pubescente suffulta; stipulae deltoideae, 2–3 mm. longae. *Pedunculi* 2 mm. longi, flores 3–4 subsessiles gerentes, simul ac receptaculum, bracteae calyxque valde adpresse pubescentes. *Receptaculum* 1·5–2 mm. altum. *Calycis* tubus lobis aequilongus, receptaculo dimidio brevior. *Corollae* tubus 5 mm. longus, lobis oblongis 3 mm. longis intus pubescentibus. *Antherae* inclusae, fere sessiles. *Stylus* gracilis, ramis 4 divergentibus 0·5 mm. longis. *Fructus* niger, 5 mm. longus, calycis lobis persistentibus ornatus, 3 (vel ultra?) locularis.

South India. Madras: Pulneys, *Wight*; in the woods near Kodaikanal and on the downs, *Fyson*.

The slender, erect, unbranched stem and the long, very slender, horizontal branches, with leaves all facing upwards, and the axillary white flower gives this very much the appearance of the cultivated coffee.

782. **Rhododendron burmanicum,** *Hutchinson* [Ericaceae-Rhododendreae]; affinis *R. formoso*, Wall., foliis supra densissime lepidotis facile distinguitur.

Frutex ramosus; ramuli brunnei, parcissime pilosi. *Folia* oblanceolata vel subobovato-oblanceolata, sensim obtuse acuminata, basi attenuata, 6–8 cm. longa, 1·75–3 cm. lata, subcoriacea, utrinque densissime lepidota, juniora tenuiter ciliata, demum glabra; nervi laterales utrinque 9–11, a costa media sub angulo 45° divergentes, utrinque inconspicui; petioli robusti, 0·5–1 cm.

longi, circiter 3 mm. crassi, brunneo-lepidoti, basi interdum parce ciliati. *Perulae* exteriores late ovatae, longe caudato-acuminatae, submembranaceae, extra dense lepidotae, longe ciliatae, interiores suborbiculares, mucronatae, margine albo-villosae, extra parce lepidotae. *Flores* terminales, 5–6, viridi-albi, valde proterogyni. *Calyx* subnullus, longe piloso-ciliatus, pilis reflexis. *Corollae* tubus campanulato-obconicus, basi 1 cm., apice 3–3·5 cm. diametro, extra lepidotus, intra postice flavo-maculatus; lobi 5, subpatuli, ovato-rotundati, 2 cm. longi et diametro. *Stamina* 10, leviter exserta; filamenta 2·5–3·5 cm. longa, inferne albo-villosa; antherae 4–5 mm. longae. *Discus* carnosus, lobatus. *Ovarium* 6-loculare, oblongum, dense lepidotum, leviter costatum; stylus exsertus, 4 cm. longus, 1·5 mm. crassus, inferne parce lepidotus, stigmate capitato fere 0·5 cm. expanso coronatus.

Burma. Described from fresh material from the Royal Botanic Gardens, Glasnevin, grown from living plants collected by Mrs. Wheeler Cuffe on Mount Victoria, Burma. The flowers are very sweet scented; the large stigma protrudes long before the corolla expands.

783. **Andersonia concinna,** *N. E. Brown* [Epacridaceae-Epacreae]; affinis *A. variegatae*, Sond., sed foliis longioribus patulis acutioribus, bracteis longioribus et acuminatis et floribus majoribus differt.

Frutex nanus, ramosus, foliosus. *Folia* alterna, 5–8 mm. longa, basi 3 mm. lata, amplexicaulia, ovata, acute vel subobtuse acuminata, torta, patula, glabra. *Flores* ad apicem ramorum capitato-glomerati vel interdum solitarii, sessiles. *Bracteae* 12–14, imbricatae, ovatae vel lanceolatae, subpungenti-acuminatae, interiores 5·5 mm. longae, calyce multo breviores, exteriores gradatim minores, virides vel apice sordide purpurascentes, glabrae vel minutissime subpuberulae. *Sepala* libera, erecta, 8 mm. longa, 1·5–2 mm. lata, anguste lanceolata, 3 exteriora obtusa, 2 interiora acuta, glabra, minutissime ciliata, pulchre rosea. *Corolla* 7 mm. longa, sepalis brevior; tubus 3 mm. longus, glaber; lobi 4 mm. longi, 1 mm. lati, linearis-lanceolati, obtusi, extra glabri, intra apice glabri inferne barbati. *Stamina* libera, 4·5 mm. longa, filamentis superne pubescentibus. *Ovarium* apice truncatum, glabrum; stylus 5 mm. longus, medio pubescens; stigma capitatum.

Western Australia. Narrogin, *F. Stoward* 1.

784. **Olea Bournei,** *Fyson* [Oleaceae-Oleineae]; ab *O. paniculata*, Br., et *O. glandulifera*, Wall., foliorum nervis lateralibus paucioribus etiamque ab hac foliis brevioribus magis rotundatis magisque acuminatis recedit.

Arbor, ramulis decussatis, cortice griseo multi-lenticellato obtectis. *Folia* late ovata vel elliptica, apice acuminata, basi in petiolum angustata, 6 cm. longa, 3·5 cm. lata, pagina utraque glabra, viridia, nervis lateralibus utrinque 2–3, petiolo gracili 2–3 cm. longo erecto vel ramulo adpresso suffulta. *Paniculae* et terminales et in axillis supremis, 5–10 cm. longae et diametro, ramis oppositis horizontalibus, pedicellis 1 mm. longis; alabastra globosa. *Corolla* rotata, 4 mm. longa, calycem duplo superans, lobis rotun-

datis 1·5 mm. longis. *Stamina* corollae aequialta, divergentia, antheris magnis. *Stylus* brevis, lateraliter compressus. *Drupa* viridis, anguste ovoidea, 1·2 cm. longa, 5 mm. diametro; semina latere uno canaliculata.

South India. Nilgiri Plateau: near Pykara, 2040 m., *Fyson* 2462, 2497, *Wight* Hb. Propr.; Avalanche, *Wight*, K.D. 1796; Bababoodan Hills, *Hohenacker* 503.

O. Bournei was included by C. B. Clarke in Fl. Brit. India, vol. iii. p. 612 under *O. glandulifera*, Wall., a native of Nepaul.

785. **Syringa alborosea,** *N. E. Brown* [Oleaceae-Syringeae]; affinis *S. Rehderianae*, Schneider, sed ramis glabris, foliis subtus viridibus, inflorescentia subparva laxa et calyce distincte dentato differt.

Frutex 2·5–3 m. altus, cortice brunneo; rami juniores glabri. *Foliorum* petioli 1–2 cm. longi, supra sulcati, plus minusve puberuli; laminae 4·5–9 cm. longae, 2·5–5 cm. latae, ellipticae, acutae vel subobtusae et apiculatae, basi latissime rotundato-cuneatae, in petiolo decurrentes, utrinque parce pubescentes, virides, subtus pallidiores. *Inflorescentia* terminalis, erecta, 5–12 cm. longa, 4–6 cm. lata, laxa, pilis patulis pubescens. *Pedicelli* ad 0·75 mm. longi. *Calyx* 3 mm. longus, campanulatus, 2–4-dentatus, pubescens, dentibus late ovatis subacutis. *Corollae* tubus 0·8–1 cm. longus, pallide roseus; lobi 2·5–3 mm. longi, ovati, acuti, patuli, albi.

China, without precise locality, *Wilson* 1739.

Described from a living plant raised by Messrs. J. Veitch and Sons from seed collected by E. H. Wilson in China, and presented by them to Kew in 1913, where it flowered in June, 1914.

786. **Gentiana apiata,** *N. E. Brown* [Gentianaceae-Swertieae]; affinis *G. nivali*, Pall., sed floribus subduplo minoribus et calyce parvo facile distinguitur.

Herba perennis, omnino glabra. *Folia* radicalia 5·5–8 cm. longa, 5–7 mm. lata, lineari-lanceolata, acuta, uninervia, costa subtus carinata; folia caulina 3·5–5·5 cm. longa, 0·9–1·3 cm. lata, lineari-lanceolata, acuta, 3-nervia. *Caules* florentes ad 16 cm. alti, pallide virentes, internodiis 3–5·5 cm. longis. *Cymae* 1–3-florae, axillares et terminales, inferiores pedunculati, superiores sessiles. *Pedicelli* nulli. *Bracteae* 1·5 cm. longae, 2·5 mm. latae, foliiformes. *Calycis* tubus 7 mm. longus, tubuloso-campanulatus vel interdum spathaceo-fissus, pallide virescens; lobi inaequales, patuli, 1–5 mm. longi, virides. *Corolla* 2·5 cm. longa, 2 cm. diametro, infundibuliformis, pallide viridi-alba punctis lineisque atroviridibus notata; tubus 2–2·2 mm. longus, subangularis; lobi 5 mm. longi, basi 8–9 mm. lati, suboblique late deltoideo-ovati, subacuti; squamae nullae. *Stamina* inclusa; antherae oblongae, subbasifixae, extrorsae. *Ovarium* stipitatum; stigma bilobum.

North China, without precise locality, *Purdom* 406.

Described from a living plant sent to Kew by Messrs. J. Veitch and Sons, who raised it from seed collected by Mr. Purdom in North China.

787. **Alseodaphne Keenanii,** *Gamble* [Lauraceae-Cinnamomeae]; *A. petiolari*, Hook. f., affinis, foliorum reticulatione magis minuta, foliis infra pubescentibus apice obtuse acuminatis, paniculis foliis multo longioribus magis ramosis ramis gracilioribus differt.

Arbor magna; ramuli crassi, fere nigri, lenticellis paucis inconspicuis, ultimi minute ferrugineo-puberuli. *Folia* subcoriacea, elliptica, apice obtuse breviter acuminata, basi acuta, 12–24 cm. longa, 10–12 cm. lata, supra glabra, opaca, minute reticulata, infra glaucescentia et saltem juniora minute ferrugineo-puberula; costa gracilis, supra canaliculata, infra prominens; nervi utrinque 9–11, supra plani, infra prominentes, curvati et prope marginem arcuatim juncti; nervuli transversi distantes, conspicui, saepe ramosi, reticulationem areolatam includentes; petiolus crassus, 4–5 cm. longus. *Flores* in panicolas ramosas e foliorum ultimorum axillis ortas ad 35 cm. longas dispositi; pedunculus communis 10–15 cm. longus; rami multi, in cymas 5–6–floras desinentes; pedicelli graciles, stellato-puberuli, circa 2 mm. longi, fructiferi (immaturi) incrassati. *Perianthii lobi* ovati, stellato-puberuli, 3 exteriores 1·5–2 mm. longi, trinervii, 3 interiores 2–2·5 mm. longi, 5–nervii, in fructu caduci. *Stamina* minuta, ordinum i et ii oblonga, antheris glabris glanduloso-punctatis, filamentis villosis, 1 mm. longa, ordinis iii 1 mm. longa, antheris rectangularibus glanduloso-punctatis, filamentis brevibus villosis et glandulis 2 magnis subglabris juxta basim munita; ordinis iv staminodia minuta, 0·5 mm. longa, cordata, aliquando o. *Ovarium* ovoideum, glabrum, stylo brevi obliquo, stigmate capitato. *Drupa* matura non visa, immatura ellipsoidea, glabra, pedicello incrassato minute puberulo.

Burma. Myitkyina District at Chipwikha, 900 m., vern. ‘ Maru ’ Burm., 22nd Sept., 1912, *Maung Kyaw* 49 (Herb. Lace).

Assam. Cachar: at base of Goolteelah (near Dumcherra?) “ panicle branches red appearing from a distance like flowers,” Sept. 1873 *Keenan* (quoted in Fl. Br. India under *A. petiolaris*, Hook. f.).

788. **Rhopalocnemis ruficeps,** *Ridl.* [Balanophoraceae]; a *R. phalloide*, Jungh., rhizomate elongato repente, volva nulla, pedunculo cylindrico alto, capitulo cylindrico rubro distincta.

Rhizoma ramosum, elongatum, teres, ultra 15 cm. longum, 5 mm. crassum, flavum. *Squamae* et *volva* desunt. *Pedunculus* cylindricus, teres, 8–10 cm. longus, 7 mm. crassus, nudus, flavus. *Capitulum* ovoideum ad cylindricum, 4-10 cm. longum, 2–3 cm. crassum, roseum, bracteis caducis coccineis ornatum. *Bracteae* stipitatae, conicae, 4–6–angulatae, 5 cm. longae. *Flores masculi* minuti, 2 mm. longi. *Perianthii lobi* 4, oblongi, truncati, breviter ad bases connati. *Androecium* brevius, columna crassa, antheris ellipsoideis in capitulo oblongo obtuso, loculis linearibus 8. *Flores foeminei* minuti, complanati, perianthio elliptico tubuloso. *Styli* 2, stigmatibus discoideis. *Capilli* interflorales in utroque sexu copiosissimi, densi, flores includentes.

Malay Peninsula. Perak: Taiping Hills in dense forest, *Low*, *Ridley*, *J. Anderson*; Penang: *Stoliczka* in herb. Calcutta; Penara Bukit, *Ridley*.

789. **Triglochin Stowardii,** *N. E. Brown* [Naiadaceae-Juncagineae]; affinis *T. calcitrapae*, Hook., sed fructibus pedicellatis subduplo longioribus calcaribus duplo brevioribus et gracilioribus differt.

Herba annua, 10–14 cm. alta, glabra. *Folia* 3–5 cm. longa, 0·5 mm. crassa, terete-filiformia, acuta. *Pedunculi* 4–12 cm. longi, 0·5–0·75 mm. crassi, apice laxe racemoso–2–7–flori. *Pedicelli* 0·5–3 (fructu 2·5–8) mm. longi, adscendentes. *Perianthii* segmenta 6, lanceolato-ovata, acuta vel acuminata, concava, carinata; 3 exteriora 1·5–2 mm. longa, basi gibboso-calcarata; 3 interiora 2 mm. longa, ecalcarata. *Antherae* 6, sessiles. *Ovarium* 3–loculare; stigmata sessilia, truncata. *Fructus* 1·5 cm. longus, inferne 1·3 mm. crassus, attenuato-trigonus, apice truncatus, basi 6–calcaratus; calcaria 1·5 mm. longa, gracilia, incurvato-uncinata, subtus per paria membrana chartacea connexa.

Western Australia. Beverley, Sept. 1913, *F. Stoward* 35.

790. **Andropogon** (**Amphilophis**) **Grahamii,** *Haines* [Gramineae-Andropogoneae]; species *A. Ischaemo*, L., affinis, sed habitu robusto suffruticoso multiramoso, vaginis ramos subtendentibus ampliusculis, laminis plerumque glaberrimis, articulis racemorum brevius ciliatis, spiculis pedicellatis neutris ad glumas 2 vel 3 reductis.

Gramen perenne, suffruticosum. *Culmi* teretes, nitentes, saepe geniculati, crebre ramosi, ramis saepe ad nodos fasciculatis. *Foliorum* vaginae inferiores et intermediae ramos subtendentes, patentes, ampliusculae, striatae, superiores arctae, laeves, omnes glaberrimae, nisi ad nodos magis minusve pilosae; ligulae breves, truncatae; laminae lineares, sursum longe setaceo-attenuatae, 6–12 cm. longae, 3–4 mm. latae, glaucae, praeter margines scaberulos laeves, glaberrimae, rarius basi pilis perpaucis conspersae. *Racemi* 3–7, 3·5–5 cm. longi, flexuosi, multinodes, in rhachi communi raro 2 cm. excedente pedunculati, pedunculis teretibus glabris 5–8 mm. longis, axillis parce pilosulis; articuli uti pedicelli dense ciliati, ciliis summis iis paulo brevioribus, applanati, dorso vix exarati. *Spiculae sessiles* oblongae, 3·5 mm. longae, praeter apices saepe purpurascentes pallide virescentes; gluma I. apice truncata, inter carinas 5-nervis, carinis scabrido-ciliolatis pilis longis nonnullis praecipue superne instructis, marginibus anguste implicatis, callo pilis ad 1 mm. (vel paulo ultra) longi obsito; gluma II. lanceolata, acuta, primam subaequans, laevis, margine hyalino tenuiter ciliolato, 3-nervis; gluma III. lanceolata, tenuiter hyalina, quam secunda vix quarta parte brevior, in margine tenuiter ciliolata, 1–3 nervis, nervis tenuissimis; gluma IV. angustissima, in aristam abeuns et cum ea 15–20 mm. longa. *Spiculae pedicellatae* neutrae, sessiles aequantes, sed angustiores, magis purpurascentes; gluma I. inter carinas 5–7-nervis, caeterum ut in spicula sessili, nisi minus rigida; gluma II. oblonga, 2·5 mm. longa, hyalina, tenuissime 1- vel 2-nervis; gluma III. oblonga, 1·5 mm. longa, enervis.

India. Central Provinces: in the Amakantak Hills, often gregarious in old jhumed lands (bewars), *Haines* 3646.

This species has been named after Mr. R. J. Graham, Economic Botanist, Central Provinces, India.

XXXIII.—HOW SAPROPHYTIC FUNGI MAY BECOME PARASITES.

G. Massee.

It is very generally believed that diseases of plants, caused by fungi, continue to increase in number, and in the case of cultivated plants this is probably true, not because the adaptive power of fungi is greater than at any previous period, but simply because the opportunities for exercising the adaptive power possessed by fungi are more frequent at the present time, too often due to a departure from the normal on the part of the host-plant, brought about by cultivation.

Quite recently my attention was called to a batch of *Clerodendron fallax*, Lindl., in one of the houses at Kew; the gardener had noticed the presence of numerous minute watery-looking drops, on the under surface of the leaves, an unusual phenomenon, not to be found on another batch of the same kind of plant growing under slightly different conditions as to temperature and moisture. On investigating the matter it was found that the under surface of the leaf, more especially towards the base, was studded with comparatively large, peltate glands, supported by a very short central stalk. These glands each exuded a liquid drop which had a very sweet taste. The ubiquitous floating spores of *Cladosporium epiphyllum*, Pers., found these sugary drops a congenial pabulum, and each gland was soon tipped with a fruiting tuft of *Cladosporium*. At first the *Cladosporium* was strictly confined to the glands, and depended on the secretion for its support, but it gradually passed from the saprophytic condition, and entered that of a facultative parasite, passing beyond the range of the gland and attacking the surrounding living tissue of the leaf, forming conspicuous brown, dead patches on the upper surface. Three weeks after the disease first appeared, the spores of the fungus were capable of infecting any portion of the leaf, quite apart from receiving an initial start on the sugary excretion from a gland. The above is a concrete example of a saprophytic fungus becoming a parasite within a brief period of time. It is unlikely that all the conditions necessary to effect this change will ever occur again, hence the epidemic will be of short duration, but it can be readily imagined that if the host-plant had been an outdoor crop, and the epidemic had remained unchecked, the fungus might have become a pronounced parasite, capable of continuing its ravages for all time.

Judging from the number of examples sent to Kew for determination, mechanical injuries of various kinds, often self-inflicted, are a source of perplexity as to their origin. Wind is the most important factor. The gourds that are trained up poles in the herbaceous ground furnish striking examples. When a young fruit happens to be overhung by a leaf, and the latter is gently swayed to and fro by the wind, the rigid hairs on the under surface of the leaf form a series of more or less parallel scratches on the surface of the fruit. As the direction of the wind changes, the series of lines on the fruit cross each other diagonally, or form a

more or less regular pattern. Such wounds are not very noticeable at first, but as the fruit increases in size the wounds are torn wider apart and periderm is formed along the edges of each wound, so that by the time the fruit has reached its full size, each individual scratch is clearly outlined by a raised ridge of whitish periderm. The above is what happens if no fungus appears on the scene, but as a rule the wounds while quite newly made are invaded by the spores of some facultative parasite, most frequently *Botrytis* or *Cladosporium*. In this case the original source of injury is soon obliterated, and a soft rot follows.

The leaves of gooseberries are frequently scratched by the spines on neighbouring branches, the sign that wind has been the active agent is indicated by the parallel rows of scars, which become clearly outlined by whitish periderm.

Holly leaves often suffer from the effects of wind, becoming wounded by the spines on the leaves of a neighbouring branch. When actual perforations are made, the injury is usually attributed to some insect. When the leaves are only slightly punctured, the wound often forms a starting point for one of the many micro-fungi attacking leaves, or a growth of periderm gives the leaf a spotted appearance.

The opportunities described above for saprophytic fungi having a tendency to become parasites, must necessarily be repeated in a wholesale manner in nature. In the majority of instances the opportunity is not of sufficiently long duration to enable the fungus to become an obligate parasite, which only means that a fungus has fed for so long a time on food supplied by one special kind of host-plant, that it cannot change, without undergoing at least very great inconvenience to itself, or if it has become rigid, cannot change under any circumstances. For this reason the evolution from saprophytic to parasitic fungi is not rapid, due simply to lack of opportunity, at the same time it cannot be doubted that a certain amount of headway is made in this direction, and the primary factor rendering possible such progress may be of a very trivial nature in itself.

XXXIV.—MISCELLANEOUS NOTES.

Mr. F. Glover.—Mr. F. Glover, a member of the gardening staff of the Royal Botanic Gardens, has been appointed, on the recommendation of Kew, a Sub-Inspector for the purposes of the Destructive Insects and Pests Acts under the Board of Agriculture and Fisheries.

Mr. W. N. Evans.—Mr. W. N. Evans, a member of the gardening staff of the Royal Botanic Gardens, has been appointed, on the recommendation of Kew, a Sub-Inspector for the purposes of the Destructive Insects and Pests Acts under the Board of Agriculture and Fisheries.

Dr. C. B. Robinson.—It was with great regret that we learnt of the murder of Dr. C. B. Robinson, of the Bureau of Science, Manila, in Amboina on December 5th, 1913. Dr. Robinson had gone to Amboina in order to collect over the classic ground visited by Rumphius, and to obtain as complete a collection as possible of the species figured and described by Rumphius. Mr. E. D. Merrill, who proceeded to Amboina immediately on hearing of Dr. Robinson's death, has sent us particulars of the melancholy event, and a copy of the official report of his death, and he also informs us that he has recovered and taken to Manila the whole of the botanical collections made in Amboina by Dr. Robinson. It is a matter of no small gratification to know that his valuable work has been preserved, and it is Mr. Merrill's intention to distribute the collection in two sets, one of which will consist of those plants that can be definitely connected with the species figured and described by Rumphius.

From the information sent to Kew by Mr. Merrill it would appear that the murder was committed largely from fear on the part of the Boetonese, perhaps also for the sake of robbery. Immediately after the murder had been committed, reflection appears to have followed, and in order to wipe out every trace of their deed the murderers threw the body into the sea without anything having been stolen. It is possible, as suggested in the official report, that Dr. Robinson was the victim of superstitious fear caused among the inhabitants by his sudden and unexplained appearance in the lonely spot to which he had walked unaccompanied. Dr. Robinson was very popular with the natives and with their children, and frequently made journeys alone, so that the true cause of the murder is somewhat obscure. His death caused general mourning among the population of Amboina.

Dr. Robinson was a British subject, a citizen of Nova Scotia, and for two years was in residence at Christ's College, Cambridge. It was only a few years ago that he visited Kew on his way from the Philippine Islands to Nova Scotia. His untimely end is a great loss to botanical science.

Joseph Reynolds Green, F.R.S.—The death of Reynolds Green on June 3rd will have come as a great shock to his many friends, and not least to those who were associated with him during his work at Kew.

Green began working in the Jodrell Laboratory in the autumn of 1892, and went on for some years, so far as his other engagements allowed. Two of his most important physiological papers were the outcome of this period, namely, his "Researches on the Germination of the Pollen-grain and the Nutrition of the Pollen-tube,"* and his memoir on "the Action of Light on Diastase and its biological significance."†

Green, besides being a most competent investigator, was an exceedingly pleasant man to work with, and very popular with

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* Phil. Trans. Royal Soc. B. 184 (1894) pp. 385–409.

† Ibid. B. 188 (1897) pp. 167–190.

those who met him in the laboratory. The writer looks back with much pleasure on the time when Green was with him at Kew.

Green was essentially a physiologist, in fact it was doubtful at one time whether animal or vegetable physiology would claim his allegiance. It was especially the chemical side of physiology, and above all the subject of enzymes, which interested him, as shown by his work on the physiology of germination and on the proteids of latex, besides the Kew papers cited above.

His researches in this field culminated in the publication, in 1899, of his important book on "The Soluble Ferments and Fermentation"; this work was translated into German, an honour which does not often fall to the lot of an English botanical author.

Other, more general, books of his were his well-known "Manual of Botany," 1895-6, and his "Introduction to Vegetable Physiology," 1900.

In his later years Green much interested himself in the history of botany, publishing, in 1909, a work on that subject, bringing down Sachs's classical History of Botany from 1860 to 1900.

At the time of his death he had just completed a work specially on the History of Botany in England, and it is hoped that this last product of his industrious life may soon see the light.

Green was for 20 years (1887-1907) Professor of Botany to the Pharmaceutical Society; afterwards he held the post of Hartley Lecturer in Vegetable Physiology in the University of Liverpool; in his own University he was Fellow and Lecturer of Downing College. He was elected a Fellow of the Royal Society in 1895.

D. H. S.

Hedychium flavescens.—A bundle of stems sent under the name of *Hedychium flavescens* has been recently received from the Director of Agriculture, Ceylon, in order that its paper-making qualities might be tested in comparison with *Hedychium coronarium*.

The material was accordingly submitted to Messrs. Clayton Beadle and Stevens, who report as follows:—

"The material arrived in very good condition, and, if it could be supplied in bulk in the condition in which it arrived, it would be a very convenient form for converting into paper.

"We tested it by ordinary paper-making processes, and found that it could be converted into paper, samples of which we enclose herewith, which in a large measure resembles the paper obtained from *Hedychium coronarium*.

"By a process of direct conversion, whereby *Hedychium coronarium* will yield paper equal to 90 per cent. of the dry weight of the stem, *H. flavescens* yielded 60 per cent. The probability is that, by ordinary paper-making processes, by boiling under pressure and subsequently beating and so forth, whereby *Hedychium coronarium* has yielded in bulk 60 per cent. of paper, the *H. flavescens* would yield probably about 40 per cent., but this is a point that might be tested later on. The paper from *H. flavescens* is ink-proof, and has a good rattle and strength, and is what we call 'normal hide-bound' paper.

"The mean bursting strain, corrected to a thickness of 0·1 milligrams (= a substance of 84 grams per sq. metre), was 49 lbs. to the sq. in., and the mean breaking length 6·35 kilometres. This may be described as a strong paper, very much resembling that obtained from *H. coronarium* under similar circumstances."

Buchu.—Buchu is an important drug for which there is usually a steady demand in the English market. The leaves of three species of *Barosma*, viz., *B. betulina*, *B. serratifolia*, and *B. crenulata*, erect shrubs indigenous to South Africa, are generally recognised in commerce, but the first-mentioned species is alone officinal in the British Pharmacopoeia. They have a characteristic penetrating odour, and a strongly aromatic taste, and though the leaves of several allied genera are occasionally offered as Buchu, the peculiar properties of the true drug render the detection of the substitute comparatively easy.

The following particulars on the Production and Protection of Buchu, in the Union of South Africa, are taken from the "Report of the Chief Conservator of Forests for the 15 months' period ending 31st March, 1913," a copy of which has recently been received at Kew. The following figures show the Buchu exports and value during the past six years:—

1907 ...	291,334 lbs.,	valued at ...	£9,201
1908 ...	243,472 ,,	,, ...	7,284
1909 ...	260,126 ,,	,, ...	9,666
1910 ...	273,325 ,,	,, ...	24,428
1911 ...	212,082 ,,	,, ...	29,647
1912 ...	223,021 ,,	,, ...	38,264

and the highest price paid in London during 1912 was 6s. 6d. per lb. for best selected clean green leaf of the *Barosma betulina* variety. It is understood that the demand for this medicinal herb, which is only found in the Western Districts of the Cape Province, is steadily increasing.

The following shows the ports of export for 1912, and the declared value on export:—

Cape Town ...	221,338 lbs.,	valued at ...	£38,166
Port Elizabeth ...	51 ,,	,, ...	2
Mossel Bay ...	1,632 ,,	,, ...	96
	223,021 lbs.		£38,264

Based on the declared value the average price per lb. works out to 3s. 5·18d. before leaving South Africa.

The Department during 1912 raised the price of Buchu (*Barosma serratifolia*) in Forest Reserve and Crown land areas in the Swellendam Division from 2d. to 6d. per lb., and at the same time divided up the areas so as to enable close seasons to be maintained over some so as to allow the shrub to rest, recuperate, and shed seed before plucking is next allowed on the area.

On the Cedarberg, where the *Barosma betulina*, the most valuable of the Buchu, grows, the price was raised from 1s. 6d. to 2s. 6d. per lb., and that reserve was divided into four Buchu areas,

only one of which is allowed to be harvested over each year. During the fifteen months' period under review, two areas were dealt with—one in January, 1912, and the other in January, 1913, and the yield was as follows:—

1912 Area (No. 3), 39,119 lbs. at 1s. 6d. per lb. ...	£2,933	18	6
1913 Area (No. 4), 23,972 lbs. at 2s. 6d. per lb. ...	2,996	10	0
63,091 lbs.	£5,930	8	6

The Department is indebted to the Police generally, and the Clanwilliam Police particularly, for assisting Forest Officers in the suppression of Buchu thefts.

Private individuals are beginning to see that the Government Buchu areas, in consequence of being worked in a systematic and judicious manner, are realising a handsome revenue to the State, and there are evidences that private individuals, on whose farms the shrub is found, are making attempts to foster its growth and protect it from the devastating veld fires so common in many districts at certain seasons of the year."

At the last Drug-Auctions held in Mincing Lane on the 28th May, 23 bales of Buchu were offered, the prices ranging from 2s. 2d. to 5s. 2d. per lb. according to quality.

Some further information on the Buchus appeared in *Kew Bulletin*, 1912, p. 326. J. M. H.

Presentations to Museums.—The following miscellaneous specimens have been received in addition to those previously recorded in the *Bulletin*:—

Mr. T. W. Adams, Greendale, New Zealand.—Cones of *Pinus tuberculata*.

Professor C. S. Sargent, F.L.S., Arnold Arboretum, U.S.A.—Fruits of *Zizyphus sativa* from China.

Mr. John Christie, Mark Lane, London, E.C.—Photomicrographs of stem of *Bambusa vulgaris* and of fibre of *Broussonetia papyrifera*.

Mr. E. N. Kent, Hemel Hempstead. Six specimens of fancy woods as used for making brush-backs.

Major Sir E. Grogan, Bart., Santiago, Chile.—Plants of Yareta (*Azorella* sp.), Mount Tacora, Andes.

Mr. A. G. Campbell, Richmond, Surrey.—Photograph of Gebang Palm (*Corypha Gebanga*), Java.

Mr. T. Burbidge, Chiswick.—Sample of oak from River Moksha, Russia.

Mr. W. R. Price, Pen Moel, Chepstow.—Collection of woods, fibres, fabrics, etc., from Formosa and Loochoo Islands.

Conservator of Forests, Nairobi, British East Africa.—Fifteen specimens of indigenous timbers.

Mr. W. P. Ellmore, Leicester.—Twelve bundles of willow rods as used for basket and chair-making.

J. M. H.

Botanical Magazine for June.—The plants figured are *Hypericum Ascyron*, Linn. (t. 8557); *Vitis Thunbergii*, Sieb. and Zucc. (t. 8558); *Deutzia mollis*, Duthie (t. 8559); *Tricyrtis stolonifera*, Matsumura (t. 8560), and *Stapelia Leendertziae*, N. E. Brown (t. 8561).

One of the finest of the St. John's Worts in the very large-flowered form of *Hypericum Ascyron*, which has been raised at Kew from seed obtained in Korea and presented by Mr. M. L. de Vilmorin. Its erect stems reach a height of 3 or 4 feet, and produce in July and August terminal corymbs of deep yellow flowers which often exceed 4 inches in diameter. In the ordinary form the flowers are from 2 to 2½ inches across. The species is widely distributed in North America and in Temperate Asia, and has been cultivated in this country since 1774.

The publication of a figure of the true *Vitis Thunbergii* provides means for distinguishing this plant from another which, though quite distinct, is repeatedly met with in living collections under the name of *V. Thunbergii*, but which is really a very fine form of *V. Coignetiae*, Pulliat. The plant now figured has much smaller deeply lobed leaves. It is a native of China and Japan, and though quite hardy at Kew, it does not grow so vigorously here as in the garden of Canon Ellacombe, at Bitton, near Bristol, whence the material for the illustration was obtained.

Deutzia mollis has been introduced from Central China by Messrs. James Veitch and Sons, in whose nurseries at Coombe Wood the plant which supplied the material for the figure was grown. It is a distinct and striking species, easily recognised among the Deutzias in cultivation by the soft felt-like indumentum especially of the under-surface of the leaves. At Kew the plant is subject to injury from late spring frosts.

The *Tricyrtis* is a native of Formosa, where seeds were collected by Mr. H. J. Elwes and Mr. W. R. Price. Some of these were presented to Kew by Mr. Elwes, and a plant raised from them provided the specimen figured. The genus belongs to the *Liliaceae*, and includes about ten species, which are distributed from Japan and Formosa to the Central and Eastern Himalaya. The wild plants of *T. stolonifera* observed in Formosa, where the species is found at altitudes of about 7000 feet, were only about a foot high, but the plants at Kew, grown in a cool house, reached a height of two feet.

Stapelia Leendertziae is a remarkable species. Instead of having a flat saucer-shaped corolla characteristic of the genus, this species has an elongated campanulate corolla, the tube of which is 2 to 2½ inches long and 1¾ to 2¼ inches across. In *S. nobilis*, figured at t. 7771 of the Botanical Magazine, there is also a distinct corolla-tube, but it is much shorter than in the species now illustrated, which was discovered near Heidelberg in the Transvaal by Miss R. Leendertz, now Mrs. R. Pott, by whom a plant has been sent to Kew, where it has flowered. The figure was prepared from a plant which flowered in the garden of Mr. W. E. Ledger, of Wimbledon, in August, 1912.

Botanical Magazine for July.—The plants figured are *Gongora grossa*, Reichb. f. (t. 8562); *Kolkwitzia amabilis*, Graebn. (t. 8563); *Primula vinciflora*, Franch. (t. 8564); *Trollius chinensis*, Bunge (t. 8565), and *Rosa corymbulosa*, Rolfe (t. 8566).

The *Gongora* is a remarkable species from Ecuador. First described in 1877 from a plant which flowered in the garden of the late Sir Charles Strickland at Hildenley, Malton, Yorkshire, it appears to have been lost to cultivation till recently, when a plant was presented to the Kew collection by Mr. Walter Fox, who met with it at Tenqual in Ecuador, growing on a Cocoa tree. Flowers were produced in May, 1913, and afforded facilities for preparing the figure. The species is extraordinary in the large size of its leaves and pseudobulbs, and strikingly attractive in its long elegant racemes.

Kolkwitzia is a monotypic genus of *Caprifoliaceae*, closely allied to *Abelia*, differing in having the flowers in pairs and usually united, so that one receptacle appears to arise from the base of the other. It is probably more interesting botanically than horticulturally. Its flowers are obliquely tubular-campanulate, about $\frac{1}{2}$ inch long, and are white, flushed with rose-pink, and the strongly ribbed nut-like fruits sometimes have the ribs produced above as short horns, which are densely clothed with bristly hairs. The plant is a native of Central China, and has been introduced by Messrs. James Veitch and Sons, in whose nurseries at Coombe Wood it first flowered in June, 1910, and again in June, 1913, when Messrs. Veitch supplied the material for the figure.

Among the many species of *Primula* which, during recent years, have been introduced into our gardens from China and Northern India is the one now figured under the name of *P. vinciflora*, seeds of which were collected in South-Western China by Mr. G. Forrest, and sent to Messrs. Bees, Limited. It belongs to a small group characterised by having large solitary flowers borne on robust scapes, which rise from a sheath of later developing leaves; by having the calyx divided to the base into 5–8 segments, and by having flat seeds with a winged aril. The last-named character induced Mr. Franchet to separate the species from *Primula*, and to form with them his genus *Omphalogramma*. Professor Bayley Balfour, to whom Kew is indebted for the plant figured, has drawn attention to a peculiarity in the stamens of *P. vinciflora*. Those on the posterior side of the corolla are erect, but those on the anterior side are bent across the tube, so that all the anthers are brought together in a cone at the back of the flower. At Kew the species thrives in a cool frame.

Trollius chinensis has often been regarded as merely a form of *T. asiaticus*, Linn., while Mr. Komarov reduces it to *T. Ledebourii*, Reichb. From the latter, to which it appears to be most closely allied, it may be distinguished by having more numerous sepals. It thrives under the same conditions as those found suitable for the common Globe Flower, *T. europaeus*, Linn. The figure was prepared from material obtained from a plant introduced from North China by Messrs. James Veitch and Sons through their collector Mr. W. Purdom.

The Rose is an ally of *R. macrophylla*, Lindl., from which it may be distinguished by the absence of spines when mature, and by the many small flowers which are borne in cormybs towards the ends of the branches. As is the case with the three preceding plants figured in this issue of the Botanical Magazine, *Rosa corymbulosa* is a native of China. The Kew plants were raised from seeds collected by Mr. E. H. Wilson, and presented by Professor Sargent of the Arnold Arboretum.

Notes on Cottons.—Interest in the genus *Gossypium* has been stimulated by the publication of Watt's "Wild and cultivated cotton plants of the world," and numerous specimens have been received lately at Kew for identification.

Excellent material of two native Nigerian races of cotton, "Ishan" and "Meko," has been communicated by Mr. W. H. Johnson, Director of Agriculture, Nigeria. "Ishan" proved to be *Gossypium vitifolium*, Lam., and "Meko" *G. peruvianum*, Cav.

A fine series of specimens of "Cauto" cotton have been received from Mr. W. Harris, Superintendent of Public Gardens and Plantations, Jamaica. Mr. Harris writes under date March 3rd:—"This is said to be a 'tree cotton,' I suppose a large shrub really, and is apparently found in a wild or semi-wild state in the Cauto district of south-eastern Cuba. Our plants are only six months old from seed, and have not yet attained their full dimensions, but they are now bushes up to ten feet high. The plant is a perennial, and, according to our present information, is likely to prove of considerable agricultural value for cultivation in dry districts in the tropics. We have about two acres at Hope, and there are a good many acres at present under trial in various parts of the arid southern districts. We are now passing through a very severe drought, having had scarcely any rain since the beginning of last December, and yet the cotton bushes are in excellent condition and producing crops estimated to yield at least 1200 lbs. of seed-cotton per acre, and as this cotton has been sold at prices varying from 18 to 20 cents. per lb. in the American markets, you will see that it is a plant of much promise for lands that are now producing nothing but scrub. The President of the Cauto Cotton Company, who is now in Jamaica, tells me that he has had enquiries for twenty million dollars worth of this cotton, which appears to be used to some extent for adulterating wool for the manufacture of cheap woollen goods, for which there is an enormous demand." The following notes accompanied the specimens:—"A large shrubby perennial plant. Petals convolute, the margins undulate, pale lemon-yellow, the base of a slightly darker shade. As they grow older the outer and upper portions of the petals become slightly streaked and flushed with purple-rose. The flowers do not fully expand, and present the appearance of being semi-double."

The specimens sent agree in most of their technical characters with *Gossypium brasiliense*, Macf., from which they differ, however, in the seeds being free from one another. In view of the

statement that Cauto cotton is wild or semi-wild in south-eastern Cuba, it may possibly represent the wild stock of *G. brasiliense*; and having regard to its close agreement with that species, apart from the free seeds, it has been provisionally named *Gossypium brasiliense*, var. *apospermum*, Sprague (var. nov.), as it seems desirable to have a definite name for such an important economic plant. At the same time the possibility of its being a hybrid of *G. brasiliense* with some other species cannot be entirely excluded.

The study of its behaviour under cultivation may perhaps throw some light on this point.

Well-prepared material of an interesting wild cotton from Canouan, St. Vincent, West Indies, collected by Mr. F. Birkinshaw, has been received from Mr. W. N. Sands, Agricultural Superintendent, St. Vincent. Mr. Birkinshaw's notes are as follows:—

"*Gossypium* sp. found growing wild on the cliffs above Billy Hole, near Point de Jour, Canouan. The plant is of rather straggly growth, from about 3½ to 5 feet in height. Bolls about 1·5 cm. in length. Bracts 3 cm. long. Capsule usually 4-celled. From descriptions in Watt, 'Wild and Cultivated Cotton Plants of the World,' it appears to be very close to *G. punctatum*, var. *jamaica*."

The Canouan wild cotton is *G. punctatum*, var. *jamaica*, Watt, as suggested. The same variety has been collected recently in Jamaica by Mr. W. Harris (Flora Jamaicensis 10179, distributed as *G. hirsutum*, Linn.), on the coast line between Portland Point and Rocky Point.

Mr. Birkinshaw also collected material of three other cottons, cultivated in Union Island, St. Vincent. Of these, "Carriacou Marie Galante" is either *G. peruvianum*, Cav., or a hybrid with that species; whilst "Ordinary Marie Galante" and "Silk Cotton Marie Galante" are both forms of *G. barbadense*, Linn.

T. A. S.

Siberian Yellow Pine.—Timber merchants are constantly on the look out for new sources of lumber, and at the present time attention is being paid to the forests of Eastern Siberia, Manchuria and Korea, from whence a good class of pine wood, equal in quality to yellow and red pine of North Europe, and Canadian yellow pine, is procured. During the last two or three years several experimental cargoes have been brought to European ports, where the timber appears to have created a good impression, although the heavy freight charges incidental to its 12,000 miles journey are a serious handicap in its competition with European and North American pine woods. A Liverpool merchant gives the freight charges per standard of Canadian pine to Liverpool as about £2 2s. 6d., whereas the charges per standard from Eastern Siberian ports is about £7 10s. In its favour is the fact that larger timber can be procured, at the present time, from the Far East than from the readily accessible European and North American forests, imported logs of Siberian pine being from 18 to 23 feet long, whereas Canadian pine logs are often less than 16 feet in length. The difference in the cost of freight would appear, how-

ever, to outweigh the margin of profit that would be likely to occur from the larger timber, or by the cheaper price of felling and handling of the Asiatic kind.

Siberian yellow pine is the timber of *Pinus koraiensis*, a large tree growing up to 150 feet high in Eastern Siberia, Korea, Manchuria, etc. It belongs to the five-leaved group of the genus, and is recognised by its cylindrical, resinous winter buds, by the pubescent bark of the young wood, its dark green leaves $3\frac{1}{2}$ to $4\frac{1}{2}$ inches long, each with two glaucous lines running the full length, and by its cylindrical cones which are from 5 to 7 inches long with stalks an inch or so in length. The scales of the cones are large and prominent, and the basal ones are recurved. It has been grown in English gardens since 1861, the date of its original introduction by Mr. J. G. Veitch. It does not, however, take kindly to our gardens, and few fine specimens are known.

W. D.

Queensland Nut (*Macadamia ternifolia*).—This is an edible nut produced by a small Proteaceous tree with dense foliage, found in Queensland and in the northern part of New South Wales. The fruit consists of a two-valved fleshy exocarp, the shell being globular, smooth, shining, thick and woody, often exceeding one inch in diameter. The kernels are described as of excellent flavour, somewhat resembling, but superior to, that of the Filbert, and to be much relished by Europeans and Aborigines alike. To the latter the nuts are known as "Kendal-kendal," being valued as a nutritious article of food. Though the tree is of small dimensions, the reddish-coloured, fine-grained wood is used for cask-staves, cabinet work, veneers, shingles and bullock yokes. The tree appears to be little known outside the Australian Continent, therefore its cultivation in other tropical or sub-tropical countries would doubtless be worth a trial. It may be noted that in its native habitat timber-getters are under restrictions with regard to felling the trees.

J. M. H.

Thunderstorms at Kew.—On two occasions within a month of each other, in May and June last, two Atlas cedars in Kew were struck by lightning. On the first occasion, the evening of May 22nd, one of the tall Atlas cedars forming the avenue from the Pagoda to the south-west end of the Lake was struck and its bark torn off in a curious spiral, the rupture encircling the trunk three or four times. Some of the bark was thrown thirty to forty yards away. During the same storm three flag-stones in the paved path that surrounds the iron fence of the Japanese Gateway (which stands not far from the cedar) were lifted from the ground—one of them turned completely over. The cedar struck on the second occasion stands in the Rose Garden. The bark of this tree was also partially peeled off, but the injury was not so great as in the case of the tree struck during the earlier storm.

W. J. B.